

What Is Claimed Is:

1. A packet communication device, comprising:

a plurality of line interfaces capable of, of  
reception and transmission of a packet, at least either;

5 a plurality of ports, to which said plurality of line  
interfaces are connected, and, to which at least one  
functional processor to be used in order to perform  
functional processing on an incoming packet received by any  
of said plurality of line interfaces, can be connected as  
10 needed;

a function item judgment unit for judging a function  
item to be required for said incoming packet;

a forwarding information generator for determining a  
forwarding port for said incoming packet in accordance with  
15 said function item obtained by judging by said function item  
judgment unit, and imparting, to said incoming packet,  
forwarding information, that is information for designating  
said forwarding port; and

a forwarding path switching unit for switching a  
20 forwarding path when forwarding said incoming packet among  
said plurality of ports on the basis of said forwarding  
information.

2. The packet communication device according to Claim 1,  
25 wherein when it has been judged by said function item

judgment unit that a plurality of functional processing is required for said incoming packet, in order to forward said incoming packets successively to a plurality of ports, to which functional processors capable of executing functional processing required are connected respectively, plural forwarding information are imparted to said incoming packet.

3. The packet communication device according to Claim 2, wherein in order to forward those incoming packets which have been subjected to said plurality of functional processing to any of said plurality of line interfaces, said forwarding information generator further imparts, to said packet, forwarding information corresponding to a port, to which the forwarding line interface is connected.

4. The packet communication device according to Claim 2 or 3, further comprising a forwarding information eliminator for eliminating, after said incoming packet is forwarded to a predetermined port on the basis of said forwarding information, forwarding information corresponding to said port from forwarding information added to said incoming packet.

5. The packet communication device according to Claim 2 or 3, wherein as said incoming packet is successively forwarded on the basis of said forwarding information, said forwarding information generator further imparts, to said incoming  
5 packet, subsequent forwarding information for designating in said forwarding information which information concerning the subsequent forwarding destination is, and

wherein said device further comprises a forwarding information renewal unit for renewing, after said incoming  
10 packet is forwarded to a port to be designated in said forwarding information and said subsequent forwarding information, said subsequent forwarding information.

6. The packet communication device according to Claim 5,  
15 wherein said forwarding information and said subsequent forwarding information will be erased before said incoming packet is outputted to the outside from any of said plurality of line interfaces.

20 7. The packet communication device according to any of Claims 1 to 6, wherein said functional judgment unit and said forwarding information generator are installed in at least one of said plurality of line interfaces.

8. The packet communication device according to any of Claims 1 to 7, wherein at least one said functional processor is further provided with said functional judgment processor and said forwarding information generator.

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9. A packet communication device, comprising:

a plurality of line interfaces capable of, of reception and transmission of a packet, at least either;

one or a plurality of functional processors to be used  
10 in order to perform functional processing on an incoming packet received by any of said plurality of line interfaces;

a plurality of ports to which said plurality of line interfaces and said one or plural functional processors are connected;

15 a function item judgment unit for judging a function item to be required for said incoming packet;

a forwarding information generator for determining a forwarding port for said incoming packet in accordance with said function item obtained by judging by said function item  
20 judgment unit, and imparting, to said incoming packet, forwarding information, that is information for designating said forwarding port; and

a functional processor with a forwarding information generation function for performing functional processing on  
25 said incoming packet, determining, as a forwarding port, a

port to which any of said plurality of line interfaces is connected on the basis of a result of said functional processing, and imparting, to said incoming packet, forwarding information corresponding to said forwarding  
5 port.

10. The packet communication device according to Claim 9, wherein said function item judgment unit and said forwarding information generator are incorporated at least in one of  
10 said plural line interfaces, and

wherein when, in said forwarding information generator which is incorporated in said plural line interfaces, all forwarding ports including a port, to which a line interface for transmitting said incoming packet to  
15 the outside is connected, cannot be determined, said incoming packet is forwarded to a port to which said functional processor with said forwarding information generation function is connected.

20 11. The packet communication device according to Claim 10, wherein when said incoming packet conforms to a first item of communication protocol, all forwarding ports including a port, to which a line interface for transmitting said incoming packet to the outside is connected are determined

by the line interface which has received said incoming packet, and

wherein when said incoming packet conforms to a second item of communication protocol which is different from said first item, in said functional processor with said forwarding information generation function, a port, to which a line interface for transmitting said incoming packet to the outside is connected, is determined as a forwarding port.

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12. A packet communication device, comprising:

a plurality of line interfaces capable of, of reception and transmission of a packet, at least either;

a plurality of functional processors capable of performing the same functional processing on an incoming packet received by any of said plurality of line interfaces;

a plurality of ports to which said plurality of line interfaces and said plurality of functional processors are connected;

20 a function item judgment unit for judging a function item to be required for said incoming packet;

a forwarding information generator for determining a forwarding port of said incoming packet in response to said function item judged by said function item judgment unit, and imparting, to said incoming packet, forwarding

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information for designating said forwarding port, wherein  
when the same address information is imparted to said  
incoming packet to be received successively by any of said  
plurality of line interfaces, a port to which the same  
5 functional processor is connected, of said plurality of  
functional processors, is fixedly designated as said  
forwarding port; and

a forwarding path switching unit for switching a  
forwarding path when forwarding among said plurality of  
10 ports on the basis of said forwarding information.

13. The packet communication device according to Claim 12,  
further comprising one or plural functional processors  
capable of functional processing different from said same  
15 functional processing, wherein

when it has been judged by said function item judgment  
unit that plural types of functional processing are  
necessary for said incoming packet, said forwarding  
information generator imparts, to said incoming packet, a  
20 plurality of forwarding information corresponding to a  
plurality of ports, to which plural types of functional  
processors corresponding to functional processing of said  
plural types are connected respectively.

14. The packet communication device according to Claim 13, wherein said function item judgment unit further comprises:

5 a function search unit for searching, on the basis of address information imparted to said incoming packet, types of functional processing required by said incoming packet and a port to which a line interface for transmitting said incoming packet after the processing to the outside is connected;

10 a function item search unit for searching function items of functional processors connected to said plural ports and a connection number for each function item; and

a port search unit for searching function items of functional processors to be connected correspondingly to each of said plural ports.